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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/714,180	11/14/2003	Peter C. Rieke	50005-162 23-70727-02	9390

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EXAMINER	
LEWIS, BEN	

ART UNIT	PAPER NUMBER
1795	

MAIL DATE	DELIVERY MODE
11/02/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/714,180	RIEKE ET AL.	
	Examiner	Art Unit	
	Ben Lewis	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-39, 96-101 and 103-114* is/are pending in the application.

4a) Of the above claim(s) *96-101,103-108,110 and 111* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10, 12-29 and 31-39* is/are rejected.

7)☒ Claim(s) *11, 30,109 and 112-114* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *11/21/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 2-3, 21-22 and 38 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3. Claims 2-3 and 21-22 recites the limitation "B-site atoms". There is insufficient antecedent basis for this limitation in the claim.

4. Claim 38 recites "a system for utilizing electrical energy produced by said fuel cells" this limitation does not further limit claim 38 since this claim is directed to a fuel cell assembly which excludes auxiliary components.

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6 Claim 17 and 36 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter

which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The recitation of "said cathode layer comprises a substantially homogenous mixture of a copper-substituted ferrite material and a finely-divided form of a second material" in claims 17 and 36 is not present in the specification as originally filed.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-7, 9-10, 15-16, 18-19, 20, 23-25, 26, 28-29, 34 and 37-39 are rejected under 35 U.S.C. 102(b) as being anticipated by Forthmann et al. (Ceramic coatings for cathode contacts of solid oxide fuel cells, Werkstoffwoche '98, Band III: Symposium 3, Werkstoffe fuer die Energietechnik; Symposium 7, Werkstoffe und Korrosion, Munich, Sept., 1998 (1999), Meeting Date 1998, 149-154.)

With respect to claims 1 and 4, 5, 6, 15, 16, 18, 20, 23, 24, 25, 34, 35, 37 Forthmann et al. disclose a planar solid oxide fuel cell characterized by 2 porous

electrodes and a gas impermeable solid electrolyte. The fuel cell cathode contact layer comprised a perovskite (LASK) $La_{0.6} Sr_{0.4} Fe_{0.8} Cu_{0.2} O_3$ (See Abstract).

With respect to claims 2 and 21, Frothmann et al. teach that the fuel cell cathode contact layer comprised a perovskite (LASK) $La_{0.6} Sr_{0.4} Fe_{0.8} Cu_{0.2} O_3$ (See Abstract). Therefore the copper is present at 4 atomic percent.

With respect to claim 3, 7, 22 and 26, Frothmann et al. teach that the fuel cell cathode contact layer comprised a perovskite (LASK) $La_{0.6} Sr_{0.4} Fe_{0.8} Cu_{0.2} O_3$ (See Abstract). Therefore the copper is present at 4 atomic percent. 4 atomic percent reads on "about 5 atomic percent."

With respect to claims 9-10 and 28-29, Forthmann et al. disclose a planar solid oxide fuel cell characterized by 2 porous electrodes and a gas impermeable solid electrolyte. The fuel cell cathode contact layer comprised a perovskite (LASK) $La_{0.6} Sr_{0.4} Fe_{0.8} Cu_{0.2} O_3$ (See Abstract).

The instant specification recites: The perovskite crystal structure of an A-site and B-site-substituted lanthanum ferrite perovskite is represented by the general formula: $La_{1-x} A_x B_y Fe_{1-y} O_3$. See Page 11, Lines 20-22. Forthmann et al do not disclose any polarization resistance data. However, it is the position of the examiner that such properties are inherent, given that Forthmann et al and the present application

utilize the same copper-substituted lanthanum ferrite material. A reference which is silent about a claimed invention's features is inherently anticipatory if the missing feature is necessarily present in that which is described in the reference. In re Robertson, 49 USPQ2d 1949 (1999).

With respect to claim 19 and 39, Forthmann et al. teach that the (LASK) $La_{0.6}$ $Sr_{0.4}$ $Fe_{0.8}$ $Cu_{0.2}$ O_3 were sintered onto the interconnectors of the fuel cell stack (See abstract).

With respect to claim 19 and 38, Forthmann et al. teach interconnects with gas passages (See Fig. 2).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claim 12 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Forthmann et al. (Ceramic coatings for cathode contacts of solid oxide fuel cells, Werkstoffwoche '98, Band III: Symposium 3, Werkstoffe fuer die Energietechnik; Symposium 7, Werkstoffe und Korrosion, Munich, Sept., 1998 (1999), Meeting Date 1998, 149-154.) in view of Seabaugh et al. (U.S. Pub. No. 2003/0003237A1).

With respect to claims 12 and 31, Forthmann et al. disclose a solid oxide fuel cell in paragraph 4 above. Forthmann et al. do not specifically teach an interlayer between said electrolyte layer and said cathode layer. However, Seabaugh et al. disclose a ceramic electrolyte coating (title) wherein there are also advantages of applying interlayer films between the porous support electrode plate (either the LSM cathode or the NiO/YSZ anode) and the deposited electrolyte (YSZ) film. The purpose of such interlayer films could be either to increase performance (e.g. by incorporating catalytic materials that enhance electrochemical reactions or by locally reducing the size of particles and pores so that the density of electrochemical reaction sites is increased), or to prevent adverse chemical reactions between the support electrode and deposited film during sintering or co-sintering (Paragraph 0015). Therefore it would have been obvious to incorporate the interlayer of Seabaugh et al. into the fuel cell system of Forthmann et al. because Seabaugh et al. teach that The purpose of such interlayer films could be either to increase performance (e.g. by incorporating catalytic materials that enhance electrochemical reactions or by locally reducing the size of particles and pores so that the density of electrochemical reaction sites is increased), or to prevent adverse chemical reactions between the support electrode and deposited film during sintering or co-sintering (Paragraph 0015)

11. Claims 13-14 and 33-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Forthmann et al. (Ceramic coatings for cathode contacts of solid

oxide fuel cells, Werkstoffwoche '98, Band III: Symposium 3, Werkstoffe fuer die Energietechnik; Symposium 7, Werkstoffe und Korrosion, Munich, Sept., 1998 (1999), Meeting Date 1998, 149-154.) in view of Badding et al. (U.S. Pub. No. 2001/0044041 A1).

With respect to claims 13-14 and 33-33, Forthmann et al. disclose a solid oxide fuel cell in paragraph 4 above. Forthmann et al. do not specifically teach wherein the copper substituted ferrite material comprises a layer having a thickness from about 1 tro 50 microns or having a thickness from about 1 to 30 microns. However, Badding et al. disclose high performance solid oxide electrolyte fuel cells (title) wherein With more conventional perovskite-type electrode materials such as $La_{0.85}Sr_{0.15}MnO_3$, or other manganites, electrode resistivity is typically about 10.sup.-2 ohm-cm, or essentially 3 orders of magnitude higher than the resistivities of precious metal-containing electrodes. In these cases the electrode designs generally involve smaller electrodes with shorter current path lengths (as low as 2 mm), higher electrode thicknesses, (>20 microns), and/or highly conductive current collectors in contact with the electrodes. Electrodes less than around 20 microns in thickness, however, are generally preferred for minimizing material usage and enhancing the flexibility and thermal shock resistance of the electrode/electrolyte structure (Paragraph 0056). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the electrode thickness of Badding et al. for the cathode thickness of Frothmann et al. because Badding et al. teach that Electrodes less than around 20 microns in thickness, however, are generally preferred for minimizing material usage and enhancing the

flexibility and thermal shock resistance of the electrode/electrolyte structure (Paragraph 0056).

Allowable Subject Matter

Claims 8, 27, 109, 112-114 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 8, 27, 109, 112-114 would be allowable because the prior art does not disclose or suggest B-site dopant selected from the group consisting nickel, cobalt, manganese, aluminum and chromium.

Claims 11 and 30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 30 would be allowable because the prior art does not disclose or suggest wherein the copper-substituted ferrite composition is in contact with said electrolyte layer.

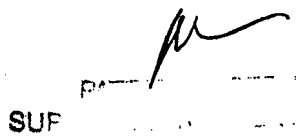
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ben Lewis whose telephone number is 571-272-6481. The examiner can normally be reached on 8:30am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Ben Lewis

Patent Examiner
Art Unit 1745



WR:jam 11/16/06 23-70727-02 597494 13449-E

Attorney Docket Number	23-70727-02
Application Number	10/714,180
Filing Date	November 14, 2003
First Named Inventor	Peter C. Rieke
Art Unit	1746
Examiner Name	Ben Lewis

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

U.S. PATENT DOCUMENTS

Examiner's Initials*	Cite No. (optional)	Number	Publication Date	Name of Applicant or Patentee
BZ		4,045,375	30 Aug 1977	Komatu
BZ		US 2001/0053467 A1	20 Dec 2001	Kaneko et al.
BZ		US 2004/0089540 A1	13 May 2004	Van Heuveln et al.

FOREIGN PATENT DOCUMENTS

Examiner's Initials*	Cite No. (optional)	Country	Number	Publication Date	Name of Applicant or Patentee
BZ		Europe	0 593 281 A2	20 Apr 1994	NGK Insulators, Ltd.
BZ		Europe	0 641 749 A1	02 Sept 1994	NGK Insulators, Ltd.
BZ		WIPO/PCT	WO 03/041196 A1	15 May 2003	Northwestern University and Functional Coating Technology, LLC

Examiner's Initials*	Cite No. (optional)	OTHER DOCUMENTS
BZ		Carter et al., "Improved Materials and Cell Design for Mechanically Robust Solid Oxide Fuel Cells," *2002 Fuel Cell Seminar*, pp. 874-877, Palm Springs, CA, November 18-21, 2002 (Abstract)
BZ		Chick et al., "Glycine-nitrate combustion synthesis of oxide ceramic powders," *Materials Letters* 10(12):6-12, 1990
BZ		Coffey et al., "Copper doped lanthanum strontium ferrite for reduced temperature solid oxide fuel cells," *Solid State Ionics* 175:73-78, 2004
BZ		Figueiredo et al., "Reactions between a zirconia-based electrolyte and $LaCoO_3$-based electrode materials," *Solid State Ionics* 101(103):343-349, 1997

EXAMINER SIGNATURE: BZ	DATE CONSIDERED: 6/11/07

* Examiner: Initial if reference considered, whether or not in conformance with MPEP 609. Draw line through cite if not in conformance and not considered. Include copy of this form with next communication to applicant.

WR:jam 11/16/06 23-70727-02 597494 13449-E

Attorney Docket Number	23-70727-02
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First Named Inventor	Peter C. Rieke
Art Unit	1746
Examiner Name	Ben Lewis

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Examiner's Initials*	Cite No. (optional)	OTHER DOCUMENTS
BL		Kindermann et al., "Chemical Interactions between La-Sr-Mn-Fe-O-Based Perovskites and Yttria-Stabilized Zirconia," *J. Am. Ceram. Soc.* 80(4):909-914, 1997
BL		Kleinlogel et al., "Temperature Solid Oxide Fuel Cells," *Electrochemical SocietyProceedings* 99-19:225-232, 1999
BL		Ralph et al., "Evaluation of Potential Cathode Materials for SOFC Operation Between 500-800°C," *Electrochemical Society Proceedings* 2001-16:466-475, 2001
BL		Simner et al., "Sintering and Property Characterization of Strontium-Doped Lanthanum Chromite," *Electrochemical Society Proceedings* 99-19:696-705, 1999
BL		Simner et al., "Development of Fabrication Techniques and Electrodes for Solid Oxide Fuel Cells," *Electrochemical Society Proceedings* 2001-16:1051-1060, 2001
BL		Simner et al., "Optimized Lanthanum Ferrite-Based Cathodes for Anode-Supported SOFCs," *Electrochemical and Solid-State Letters* 5(7):A173-175, 2002
BL		Simner et al., "Development of Cathode Materials for Low Temperature SOFCS," *2002 Fuel Cell Seminar*, pp. 344-347, Palm Springs, CA, November 18-21, 2002 (Abstract)
BL		Simner et al., "Interaction between La(Sr)FeO_3 SOFC cathode and YSZ electrolyte," *Solid State Ionics* 161:11-18, 2003
BL		Simner et al., "Enhanced low temperature sintering of (Sr, Cu)-doped lanthanum ferrite SOFC cathodes," *Solid State Ionics* 175:79-81, 2004
BL		Simner et al., "La(Sr)FeO_3 SOFC Cathodes with Marginal Copper Doping," *J. Am. Chem. Soc.* 87(8):1471-1476, 2004
BL		Steele et al., "Interfacial reactions associated with ceramic ion transport membranes," *Solid State Ionics* 75:157-165, 1995
BL		Takeda et al., "Cathodic Polarization Phenomena of Perovskite Oxide Electrodes with Stabilized Zirconia," *J. Electrochem. Soc.: Electrochemical Science and Technology* 134(11):2656-2661, 1987
BL		Tsoga et al., "Gadolinia-Doped Ceria and Yttria Stabilized Zirconia Interfaces: Regarding their Application for SOFC Technology," *Acta. Mater.* 484709-4714, 2000

EXAMINER SIGNATURE:	DATE CONSIDERED: 6/11/07

* Examiner: Initial if reference considered, whether or not in conformance with MPEP 609. Draw line through cite if not in conformance and not considered. Include copy of this form with next communication to applicant.

Notice of References Cited	Application/Control No. 10/714,180	Applicant(s)/Patent Under Reexamination RIEKE ET AL.	
	Examiner Ben Lewis	Art Unit 1745	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2003/0003237 A1	01-2003	Seabaugh et al.	427/421
*	B	US-2001/0044041 A1	11-2001	Badding et al.	429/32
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	Forthmann et al. (Ceramic coatings for cathode contacts of solid oxide fuel cells, Werkstoffwoche '98, Band III: Symposium 3, Werkstoffe fuer die Energietechnik; Symposium 7, Werkstoffe und Korrosion, Munich, Sept., 1998 (1999), Meeting Date 1998, 149-154.
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.